

CHAPTER 7

PAVEMENT

The Program Manager must confer with the Project Support Division in the office of Chief Transportation Engineer concerning policies and criteria for approvals related to street/highway design issues.

7.1 Pavement Analysis/Distress

A pavement analysis and existing condition survey are done on all projects that have paving or resurfacing, with the exception of minor patching. A pavement analysis is performed by the Design Consulting Engineer and reviewed by the District QA/QC Material Division and Asset Management Division to determine the existing pavement condition and/or to determine the type of new pavement or resurfacing required on the project.

District policy dictates the pavement type to be used in the reconstruction or rehabilitation of a roadway project although soil characteristics, traffic volume and types, climate, life cycle costs are considered. As a general rule, the types of pavement used are as follows:

- Rigid Pavement – Arterials and Collector roadways where the volumes are heavy with a high percentage of bus and truck traffic.
- Flexible Pavement – Local roads and neighborhood streets.
- Composite Pavement – As directed by DDOT. In areas where there is a considerable volume of traffic, but an asphalt surface is more desirable.
- Special Material Pavement (Cobble Stone, etc.) – Constructed in special areas, such as Georgetown, as directed by DDOT.

Traffic volume on off-system streets in the Business or Historic Districts may require a special consideration for type of pavement and treatment for the pavement.

7.2 Pavement Justification Report

The Pavement Justification Report documents the analysis and procedure used to arrive at its selection of pavement type or rehabilitation method. At a minimum, the report should include the following:

- An analysis supporting the pavement type selection or rehabilitation method.
- Life cycle cost analysis of alternate designs.
- Pavement distress survey of existing pavements.
- Pavement thickness calculations of alternate designs.
- Final recommendations for typical sections.

- Surfacing plan.

NOTE: The Project Manager shall approve the Pavement type before the project proceeds for development of plans for 30% review after conferring with the QA/QC Division.

7.3 Geotechnical Studies

The Geotechnical consultant performs a variety of field and laboratory tests, analyzes data, and prepares engineering geology plan sheets and various types of geotechnical reports. The geotechnical engineer is involved in:

- Foundations for bridges, culverts, retaining walls, ground anchoring, high-mast lighting.
- Roadway embankment settlement studies.
- Embankment and back slope failure.
- Pavement sub-grade stabilization.
- Soil laboratory testing.
- Environmental geologic problems, including wetland investigations.
- Foundation construction related problems (such as pile driving, caisson misalignment, footing excavation).
- Remote sensing for underground conditions such as bedrock and water table locations, buried tank/utilities, buried foundations, stream scour, all using ground penetrating radar and other geophysical techniques.
- Rock fall problems.
- Ground water problems.
- Low-altitude high-resolution aerial photography.
- Space constraint identification such as limited ROW, steep terrain, wetlands/streams, existing high-value land uses, soft foundations, and contaminated soils.

During the design phase, when the need for drilling or a geotechnical study is required, the Project Manager should make a request to the Geotechnical Consultant in writing and should include the plans and cross-sections of the location with his request. Typical requests are for foundation studies for bridges, culverts, and retaining walls. Requests should be done at the conceptual stages for inclusion in the Structure Selection Report.

The Geotechnical Consultant conducts and prepares the following studies for bridges and other related structures:

- Examines site and schedules a utility clearance, if needed.
- Performs drilling/sampling operations and laboratory tests.
- Determines foundation type and prepares report indicating type and bearing capacity of foundation to use.

- Prepares and reviews engineering geology plan sheet and reports. In addition to the usual foundation problems such as those with bridges or culverts, a project may involve a number of other features that may have foundation concerns or geologic hazards. The geotechnical engineer should be included in the Design Review to identify these types of problems and should participate in the follow-up and resolution of the problems identified.

7.4 Foundation Investigation/Drilling

Geotechnical investigations include drilling for various structures and preparation of a final report with appropriate foundation recommendations. Geotechnical investigations are needed to examine sites of proposed structures such as bridge foundations (piling, caissons, or spread footings), concrete box culverts, retaining walls, ground anchors, high-mast lighting, sound barriers, traffic signs and highway related buildings. The Materials and Geotechnical Consultant provide assistance in areas such as foundation construction related problems during pile driving, caisson construction and footing excavations.

The Geotechnical Consultant performs and documents the following as requested:

- Researcher files for existing reports on proposed sites.
- Examines sites of proposed structures and identifies need for utility clearances.
- Performs drilling of proposed locations and collects samples of subsurface materials.
- Assigns laboratory testing of samples.
- Prepares foundation report and indicates type and bearing capacity of recommended foundation.
- Prepares the Engineering Geology Plan Sheets.
- Submits report and plan sheet to the appropriate agency or division.

All proposals and Geotechnical Reports must be submitted to the Materials Engineer for comments. Requests for drilling and geotechnical studies must be submitted during the design phase together with site plan sheets and cross-sections as needed. At least four to six weeks is usually required for completion of drilling, lab testing, and report preparation.

7.5 Selection of Pavement Materials (Life Cycle Cost Analysis)

When comparing pavement designs, all alternatives being considered should be evaluated over the same period; i.e., compare a 30-year asphalt design to a 30-year concrete design. Alternate designs must also have the same levels of reliability and serviceability loss. For new construction and reconstruction projects, the pavement structure will be designed for both asphalt and concrete to provide accurate quantities as a basis for the life cycle cost analysis. On resurfacing and rehabilitation projects, various methods to restore the roadway

structure are considered. If one alternative is clearly cost effective, a selection shall be made based on preliminary quantities.